# The Influence of Institutional and Supportive Aspects on Entrepreneurial Innovation: Evidence from GEM Data


## Abstract

**Purpose** – The main purpose of this study is to improve the understanding of how different aspects of the national institutional environment may influence the level of innovative entrepreneurial activity across countries. Several institutional and conductive factors affecting a country's capacity to support innovative entrepreneurship is explored.

**Design/methodology/approach** – Institutional theory is used to examine the national regulatory, normative, cognitive, and conducive aspects that measure a country's ability to support innovative entrepreneurship. A cross-national institutional profile is constructed to validate an entrepreneurial innovation model. The impact of country-level national institutions on innovative entrepreneurial activity as measured by Global Entrepreneurship Monitor (GEM) data is assessed through structural equation modeling (SEM).

**Findings** – Knowledge about the influence of specific institutional aspects on innovative entrepreneurship, and hence of institutional structures within and across countries, is enhanced. For new innovative enterprises, conductive and regulatory aspects seem to matter most. All conductive factors have a significant and positive impact on entrepreneurial activity rates.

**Research limitations/implications** – Results could support policy makers and practitioners in evaluating government policies' effect on innovative entrepreneurship. Interventions should target both individual attributes and context. Future research could include longitudinal designs to measure the direction of causality.

**Practical implications** – Aspects such as regulatory institutions, and conductive factors such as ICT use and technology adoption, are important for innovation entrepreneurship development.

**Originality/value –** The literature on institutional theory and innovative entrepreneurship has been very limited. This study complements the growing interest in the empirical analysis of the impact of national institutions on innovative entrepreneurial activity and support previous empirical work.



**Keywords:** Entrepreneurial innovation, entrepreneurial activity, institutions, regulatory, normative, cognitive, conductive, technology, ICT use, structural equation modeling

**Article classification:** Research paper

## 1. Introduction

The theoretical relationship between entrepreneurship and innovation has been well established in the literature (Autio et al., 2015). Johns (2006) defines context as "situational opportunities and constraints that affect the occurrence and meaning of organizational behavior as well as functional relationships between variables"[1]. Zahra et al. (2014) emphasizes the importance of context in encouraging individual engagement in entrepreneurial activities. Context in that sense offers individual-agents with entrepreneurial opportunities and may place limits on their activities (Welter, 2011). However, the impact of context on individual agents and micro processes of entrepreneurial innovation has gained diminutive attention. Further, most of the literature has focused on individual cognitive characteristics of entrepreneurs, however, there has been a lack in research that looks at contextual embeddedness of entrepreneurship (Autio, 2015). In addition, Autio et al. (2015) emphasize the distinction between different contexts that affect entrepreneurial innovation, and identify industrial, organizational, institutional, social, temporal, and spatial contexts, which they found to be interrelated. They believe that different ecosystems generate various forms of entrepreneurial innovation, which occur because of the interaction between variant contextual elements and entrepreneurs. The notion of the National System of Entrepreneurship (NSE) introduced by Acs et al. (2014) has emphasized the importance of having a multi-level analysis, including both individual and country-level assessment. Based on this view examining one level without considering the other may not provide a comprehensive understanding of the variation in entrepreneurial activities across different countries (Schillo et al., 2016).

According to Garud et al. (2014), the literature can be divided into three themes. First, the actor-centric theme examines individuals' attributes, cognition, and networks (Garud et al., 2014). This premise locates agency in actors and focus on individuals as the main unit in entrepreneurial action. The second theme is context-centric, and focuses on the context in which entrepreneurship occurs (Aldrich and Fiol, 1994). This view is dominated by organizational, industrial, social, and institutional constructs. These contexts overlap with certain temporal (i.e. evolve over time) and spatial (i.e. geographical locus) aspects (Autio et al., 2015). Third, a multilevel approach attempts to bridge the gap between the two views by stating that opportunities are "made" or "found" through entrepreneurship, while actions are moderated by the surrounding context (Garud et al., 2014). Garud et al.'s (2014) narrative

[1] For an explanation of Johns (2006) and other definitions of context refer Walter (2011).

perspective postulates entrepreneurs as mindful agents who attempt to contextualize innovation through performative efforts and perpetual narratives.

According to Scott (1995), institutions originate from three main sources: cognitive, regulatory, and normative. These factors are stabilized through enforcement mechanisms, and have varied organizational effects. Shane (2009) emphasizes that start-up firms are not innovative because they do not generate the number of jobs required for economic growth; the latter requires a focus on high-growth firms (HGFs). Giotopoulos et al. (2017) highlight the importance of new ventures' quality in supporting economic growth. The study identified high-quality entrepreneurship by the rate of innovativeness, export orientation, and high-growth intentions of entrepreneurs. The results indicate that perception of business opportunities, educational attainment, and gender has a predominant impact on high-quality entrepreneurship in adverse economic environments. Other studies found that improving the country's institutional setting enforces the likelihood of firms becoming HGFs (Pereira and Temouri, 2018).

Lately, literature that recognizes the relationship between country-specific institutional effects and innovative activities has increased (Koellinger, 2008). This has been motivated partly by the availability of data provided by the Global Entrepreneurship Monitor (GEM) project, which distinguished between the different types and rates of entrepreneurial activity across countries possible (Bosma et al. 2010). However, it has been less apprehensive in investigating how individuals and institutions interact to decide on the type of firm an entrepreneur may develop.

The institutional context can influence the type of firms created in a country, and shape the practices that support different types of entrepreneurial activities. In other words, the institutional context can influence both the level and type of entrepreneurial activity (Bowen and De Clercq, 2008). This relationship can differ and vary in significance according to the independent variable selected—whether it is process or product innovation (Lamotte and Colovic, 2013)—and the uniqueness of national institutions (Busenitz et al., 2000). Therefore, despite advancement in research, the impact of institutional theory on innovative entrepreneurship is still subject to investigation (Acs et al., 2017).

There is a gap in understanding how contextual arrangements influence the initiation of innovative ventures. Further, detailed examination of how institutional arrangements affect entrepreneurial innovation remains limited. This paper contributes to the literature by providing an assessment of the impact of national institutions on the rate of innovative entrepreneurial activity as measured by the Global Entrepreneurship Monitor (GEM) data. There is scant literature on how certain supportive or conductive aspects' in the national environment have impacted entrepreneurial activity (i.e. Stenholm et al., 2013). This study fills this important gap and measures the effect of these aspects on entrepreneurial activity.

Further, there is also a lack of detailed examination of how national contextual arrangements influence innovative entrepreneurial ventures. Previous research has evaluated the variation in entrepreneurial activity across countries by examining country-level framework and national conditions, however, these studies overlooked how country-level institutional factors might influence the quality of entrepreneurial activity (Stenholm, 2013). Other studies have examined the impact of different institutional factors on the type of entrepreneurial ventures created (Autoi and Fu, 2015). Most of the previous studies emphasized the interrelation between the type of entrepreneurial activity, institutions and economic growth (Audretsch et al. 2008). Nevertheless, the knowledge is still limited with regard to country-level institutional influences on the type of high-impact innovative ventures. In specific, supportive institutions (i.e. conductive factors) has been ignored when it comes to country-level venture creation (Stenholm et al., 2013).

There are few studies that have used a comprehensive framework that comprises all institutional aspects in addition to supportive institutions (Schillo et al., 2016). This study adds to literature by investigating the interrelationship between individual and country-level institutional factors. In particular, this paper contributes to the literature by providing a multi-level assessment of the impact of national institutions on the rate of innovative entrepreneurial activity as measured by the Global Entrepreneurship Monitor (GEM) data. Scant research examined the effect of supportive institutions on entrepreneurial activity (i.e. Stenholm et al., 2013; Schillo et al., 2016). This study fills this important gap by using a comprehensive approach that includes both national and supportive institutions and measures its effect on innovative entrepreneurial activity.

The paper's objective is to examine which national institutions can support the creation of new innovative firms. Its conceptual underpinning acknowledges that innovative

entrepreneurship depends on the interaction between individuals and national institutional context in which firms are created (Hwang and Powell, 2005; Manolova et al., 2008). It highlights how the level of innovative entrepreneurial activity across countries is influenced, considering various aspects of national institutions. The concept of a country's institutional profile builds on Scott's (1995) and utilizes the notion that the institutional environment consists of three interrelated pillars reflects normative, cognitive, and regulatory dimensions The conductive dimension introduced by Stenholm et al. (2013) is also utilized in this study to cover the supportive aspects in the national environment. The empirical part of the paper classifies several country-specific institutional factors and construct a cross-national country institutional profile to validate an entrepreneurial innovation model (Busenitz et al., 2000). In the domain of entrepreneurial innovation, it addresses the question of which institutional and supportive factors affect a country's capacity to support innovative entrepreneurial activity. The study employs structural equation modeling (SEM) to assess the impact of country-level conditions and national institutions on innovative entrepreneurship. Each aspect comprises several institutional factors; this specification emphasizes the intrinsic complexity of the relationship between innovative entrepreneurial activity and national institutions. It investigates the effect of a country's institutions on innovative entrepreneurial activity (i.e., new products) using the 2016 General Entrepreneurship Monitor (GEM) data for 65 countries.

The paper is organized as follows. Section 2 reviews the current literature on national intuitions. Section 3 presents the link between national institutions and innovative entrepreneurial activity and proposes a conceptual framework to test the link between different national intuitions and innovative entrepreneurial activity. Section 4 describes the research methodology, and Section 5 presents the analysis and empirical findings. Section 6 concludes.

## 2. Conceptual Framework and Hypotheses

### *2.1. National Institutional Context for Entrepreneurship*

Institutional theory been increasingly employed to examine entrepreneurial activities in many contexts (Abreu et al., 2016). Institutional theory examines the process by which structures become recognized as authoritative parameters that detect social behavior (Terjesen and Hessels, 2009). At the macro level, it examines how the environment affects the organization's structures and processes (Scott, 2004). Baumol (1990) indicates that

environmental factors inform and shape different types of entrepreneurial behavior, as entrepreneurs search for the most efficient way to increase profits. Country-specific institutional arrangements direct firms' strategic behaviors, governing the nature and level of innovation that arises (Nelson, 1993). Bosma et al. (2018) emphasizes that institutions have a crucial impact on the type and prevalence of entrepreneurial activity. The prevalent perception of institutions involves the context in which innovation is embedded and taking place (Russo-Spena et al., 2017).

Scott (1995) defines institutions as "social structures with a high degree of resilience," that are composed of cultural-cognitive, normative, and regulative pillars. Their role is to give meaning and stability to social interaction and behavior. Each institutional pillar defines a different ground for compliance, and the basis for legitimacy and entitlements (Scott, 1995). These elements are held in place through enforcement mechanisms, and exert varied effects on organizations restraining their behavior (Scott, 1995). Scott, (1995, p.33) establishes that "Institutions consist of cognitive, normative, and regulative structures and activities that provide stability and meaning to social behavior. Institutions are transported by various carriers - cultures, structures, and routines - and they operate at multiple levels of jurisdiction". Scott (2003) identifies these three aspects as "pillars" of institutions. Since each institutional pillar defines a different ground for compliance, and states the basis for legitimacy and entitlements.

Thus, the context that governs individual behavior should be considered alongside an entrepreneur's characteristics (Gartner, 1985). North (1990) states that "institutions are the rules of the game," and involve formal rules, informal constraints, and their enforcement mechanisms. Informal institutions inform the culture, norms, and values of a country, while formal institutions create its rules, laws, and regulations (Bosma and Schutjens, 2011). The constraints imposed by institutional frameworks define the opportunities and types of firms that emerge in a society (North, 1990). Studies have shown that improving the country's institutional setting increases the likelihood of firms becoming high growth firms (Pereira and Temouri, 2018).

Kostova (1997) introduced the concept of country institutional profile (CIP) as a mean to measure and conceptualize country-level elements that influence organizations. The study developed a theoretical construct that explains a country's institutional profile, which

measures how regulatory, cognitive, and normative dimensions affect country-level organizational behavior. Similarly, Busenitz et al. (2000) built on Kostova (1997) and validated a measure of countries' institutional profiles to describe different aspects of entrepreneurship. Busenitz et al. (2000) emphasize the uniqueness of national institutions and its effect on the creation of different levels of entrepreneurial activity in different countries. The benefit of this approach is the recognition of a country's specific variations (Bruton et al., 2010). Many studies have investigated the relationship between entrepreneurial activity and different institutional aspects. For example, Urbano and Alvarez (2014) analyzed the impact of regulative, normative, and cultural-cognitive arrangements on the probability of an individual becoming a successful entrepreneur, and concluded that a supportive institutional environment, higher media attention, better entrepreneurial skills, and less fear of business failure increased the probability of success. Castaño et al. (2015) analyzed 2012–2017 GEM data to assess whether economic, cultural, and social factors had an impact on entrepreneurial activity, and whether it varied among countries. The results indicate that higher levels of entrepreneurship intent were more pronounced in countries with more developed social structures.

Boudreaux (2017) found cross-country evidence that institutions in the form of a high-quality legal system and open trade are associated with more innovation. Chadee and Roxas (2013) suggest that the current state of formal institutions in the form of regulatory quality, rule of law, and corruption inhibit firm innovation and performance in Russia. Cowden and Bendickson (2018) suggest that different institutional environments are interconnected with the regulative, cognitive, and normative behavior of individuals, where national institutions may influence the relationship between the cognitive motivations of entrepreneurs and the innovativeness of new ventures.

Fuentelsaz et al. (2015) examined the impact of formal institutions on total entrepreneurial activity (TEA) opportunity and necessity, focusing on factors such as business freedom, financial capital, educational capital, labor freedom, property rights, fiscal freedom, and educational capital, and found that the improvement of formal institutions supports opportunity entrepreneurship, while more developed institutions harm necessity entrepreneurship. Fuentelsaz et al. (2018) confirmed that innovation in new enterprises depends on certain individual attributes, such as risk tolerance, entrepreneurial alertness,

education, and former entrepreneurial knowledge. However, individual attributes perform differently depending on context.

Lamotte and Colovic (2013) examined the relationship between innovation and internationalization in young entrepreneurial firms using the GEM data of 64 countries, and found that enterprises involved with new product innovation are more likely to penetrate foreign markets than those involved in new process innovation. In addition, a favorable institutional environment seems to foster firms' innovation, internationalization, and competitiveness, especially in middle- and low-income countries.

Finally, Stenholm et al. (2013) used institutional theory to create a measurement system and document the cognitive, regulatory, normative, and conductive aspects that gauge a country's ability to support high-impact entrepreneurship. Stenholm et al. (2013) proposed a new institutional pillar which is the conducive or supportive aspect. This pillar measured ICT laws, university–Industry collaboration, availability of venture capital, availability of latest technology. This pillar denotes how institutional arrangements influence the "quality" of entrepreneurial activity in a country. Stenholm proposes that such high-impact entrepreneurial intentions are reinforced by a supportive environment and the interrelated relationship between innovation, individual skills, and country's resources. The results indicate that variation in institutional arrangements led to variation in the type and rate of entrepreneurial activity across countries, and that knowledge, skills, and access to capital are most important for the development of high-impact innovative firms.

The relationship between different measures of national institutions and indicators of entrepreneurial activity, might be carefully constructed along the regulatory, cognitive, and normative elements of institutions (Bosma et al., 2018). Thornton (1999) finds that the framework of Scott's (1995) institutional arrangements provides a supple and flexible approach when dealing with issue like actors' rationality, historical time, and analysis level. Previous scholarly work has asserted that these three institutional pillars must be dealt with as distinct and separate constructs that focus on each aspect of these institutions. (Valdez and Richardson, 2013). De Clercq, et al. (2011) examined the likelihood that institutions within a country serve as boundary constraints that may shape the degree to which individual-level resources (i.e. financial, human, and social capital) are exploited to create a new venture. However, a scant literature have attempted to examine entrepreneurship within the

institutional framework proposed by Scott (1995). Limited studies have relied on Scott's (1995) concept of a country institutional profile with the notion that institutional environments are comprised of three interrelated pillars indicating the normative, cognitive, and regulatory aspects (i.e. Kostova, 1997; Busenitz et al., 2000; Spencera and Gomez, 2004; Stenholm, 2013; Valdez and Richardson, 2013). This is due to the complexity of operationalization and measurement of institutional pillars, in addition to the difficulty of collecting cross-national data (Valdez and Richardson, 2013). The study draws upon the preceding literature that utilized Scott's institutional framework to conceptualize the institutional context for innovative entrepreneurship using the regulative, normative, and cultural-cognitive aspects. The assumption is that all three institutional aspects are expected to contribute in an interrelated and comprehensive manner and such inclusive view is expected to have a higher explanatory power rather than focusing on regulatory or cultural institutions alone (Valdez and Richardson, 2013). The study draw upon the earlier work done by Stenholm et al. (2013) who introduced a fourth pillar to Scot's (1995) three institutional pillars. The conducive aspect of institutional arrangements is not correlated with the "rate" of entrepreneurial activity but utterly with "type" of such activity (Stenholm, 2013; Okruhlica and Holienka, 2018). Developing on earlier studies, this study develop a cross-country institutional profile to identify the institutional aspects that may support innovative entrepreneurial activity within a country. This study aim to contribute to the argument that explain how institutions influence the rate quality of entrepreneurial activity (i.e. entrepreneurial innovative activity). Using the measures in table 1, the study test the following hypotheses in the sections below with regard to the normative, cognitive, and regulatory and supportive aspects. The conceptual framework of this study lay out the constructs, factors, and the presumed interrelation among these four pillars.

### *2.2. Regulatory aspects*

The regulative pillar emphasizes the formalized structural elements within a society. Regulatory institutions are formal structures that ensure that laws are written, enforced, and enacted within a society (Urban, 2013). Scott (2008, p. 52) defines the regulatory pillar as "Regulatory processes involve the capacity to establish rules, inspect others' conformity to them, and, as necessary, manipulate sanctions – rewards or punishments – in an attempt to influence future behavior". Several studies have employed institutional theory to examine

how the regulatory dimension, within the local institutional environment, affects entrepreneurship (Busenitz et al. 2000; Spencer and Gómez, 2004; De Clercq et al., 2010; Stenholm et al. 2013; Urbano and Alvarez, 2014; Schillo et al., 2016).

This study investigated different regulatory aspects that may affect entrepreneurial innovation within a country (e.g., access to finance, economic freedom, and government policies and taxes). Finance is an essential tool for resource allocation in entrepreneurship (Levie and Autio, 2008). The presence of a financial system can attract individual resources and influence the decision to start a new business (De Clercq et al., 2013). Furthermore, the establishment of high-growth enterprises is linked to a country's development of a financial system that is supportive of entrepreneurship (Bowen and De Clercq, 2008). Beck et al. (2005) asserted that the level of development in a country's financial system has an impact on firm's level of growth and that firm's growth is adversely associated with financial constraints. The findings of Young et al. (2017) suggest that financial regulations that enable access to capital are closely associated with the development of innovative opportunities.

Hall et al. (2013) established a positive association between institutions that advance economic freedom and entrepreneurial activity. Prior studies used a segregated measure of economic freedom to examine the effect of the various components on entrepreneurial activity (Bjornskov and Foss, 2008; Nyström, 2008). Others used a composite measure of economic freedom to test the relationship. For example, Hall et al.'s (2013) evaluation of the freedom index of U.S. data, developed by Ruger and Sorens (2009, 2011), found a positive association between economic freedom and the level of entrepreneurial activity and creation of start-up businesses at state level. Campbell and Rogers (2007) obtained the same results using the Economic Freedom of the World (EFW) index.

Mandić et al. (2017) used the GEM data of 11 EU countries to find a strong, positive, statistically significant, and long-term effect of institutions on economic freedom and entrepreneurial activity. Crnogaj and Kingdom (2016) found that higher levels of economic freedom motivate productive entrepreneurship. Sobel et al. (2007) found that countries with higher economic freedom have a higher level of TEA and lower business failure rates. Fuentelsaz et al. (2018) confirmed that the relation between certain individual attributes of entrepreneurs and innovation in new ventures is reinforced by economic freedom.

Minniti (2008) argue that government policy influences the institutional environment in which entrepreneurial decisions are made. Wennekers et al. (2005) assert that institutional government policies, including fiscal legislation and taxation, can aggravate entrepreneurial risks and affect rewards. LiPuma et al. (2013) found that high-quality institutions, including tax regulations, are positively related to new and small firms' export performance. Therefore, this study posits that:

Regulatory aspects have a positive impact on entrepreneurial innovation.

- H1. Access to finance has a positive impact on entrepreneurial innovation.
- H2. Economic freedom has a positive impact on entrepreneurial innovation.
- H3. Government policies and taxes that encourage new firms have a positive impact on entrepreneurial innovation.

*2.3. Normative aspects*

The normative pillar highlights the evaluative, compulsory, and arbitrary aspects of social life (Scott, 2003). According to Scott (2008, p 55) "Values are conceptions of the preferred or the desirable, together with the construction of standards to which existing structures or behaviors can be compared and assessed. Norms specify how things should be done; they define legitimate means to pursue valued ends". Normative institutions are social norms, values, and beliefs that are socially shared and accepted by individuals, shaping their perceptions about entrepreneurship (Veciana and Urbano, 2008). The normative pillar governs the actions of organizations and individuals, including standards of social behavior based on mandatory social, professional, and organizational aspects and their level of interactions (Bruton et al., 2010). Culture shapes people's thoughts and behavior by influencing how they view risks, rewards, and opportunities. This differing perspective influences the entrepreneurial activity undertaken in country and economic outcomes (Williams and McGuire, 2010). For example, Tominc and Rebernik (2007) showed that the higher growth aspirations of early-stage entrepreneurs may be attributed to cultural support for entrepreneurial motivation. Hechavarria and Reynolds (2009) found evidence that cultural values are related to both opportunity and necessity entrepreneurship rates.

Many studies have assessed the relationship between cultural values and entrepreneurship using Hofstede's cultural dimensions (i.e., Shane, 1992; Hayton et al., 2002; Levie and Hunt 2005). Others used cultural values as measured by GEM data to examine the relationship

between institutions' normative aspects and their effect on entrepreneurial activity (Levie and Autio, 2008; Stenholm et al., 2013; Urbano and Alvarez, 2014; Díez-Martín et al., 2016). The GEM model differentiates between national culture, identified as "cultural context," and "entrepreneurial cultural and social norms." Cultural context is treated distinctly as a contextual aspect; on the other hand, entrepreneurial, cultural, and social norms involve context-specific beliefs and attitudes toward entrepreneurship, listed as entrepreneurial framework conditions (EFCs) (Levie and Autio, 2008).

De Clercq et al. (2008) noted that economic actors may imitate the behavior of highly successful entrepreneurs, reinforcing entrepreneurship as a career choice, and the creation of new firms within a country. Aleksandrova and Verkhovskaya (2016) suggest that the perception of entrepreneurship as a successful career choice and an entrepreneur's high status given by society have a positive impact on the level of TEA. Supportive normative aspects in the form of higher media attention to new businesses increase the probability of entrepreneurship adoption. Urbano and Alvarez (2014) confirmed that higher media attention for new businesses has a positive and statistically significant impact on entrepreneurship. Subjective norms (SN) are defined as the perceived social acceptance and support for behavior, and Walker et al. (2013) suggest that SNs are related to the perception of starting a new business, and of entrepreneurship being a desirable career choice. Moreover, media coverage of successful new businesses influences entrepreneurial intentions.

Hindle and Klyver (2007) used GEM data to examine the effect of media coverage on entrepreneurship participation in 37 countries. They found that positive media coverage influences opportunities for new and existing business owners (young businesses), but not for opportunity-searching nascent or start-up entrepreneurs. The correlation was positive between media coverage and young opportunity-based entrepreneurs, and negative with necessity young entrepreneurs. Alvarez et al. (2011) used the 2006–2009 data of GEM's National Expert Survey (NES) and Adult Population Survey (APS) of 19 Spanish regions to examine the effect of formal and informal institutions on entrepreneurial activity, considering gender differences. The results show that informal institutions (e.g., cultural and social norms, as well as the perception of opportunities and entrepreneurs' social image) have a greater impact on entrepreneurial activity than formal institutions. The normative aspect of the present study is operationalized at the country level, using three variables collected from the GEM database: career choice, high status, and media attention (Bosma et al., 2012). These three

measurements were used by previous studies with varying results (Urbano and Alvarez, 2014; Barazandeh et al., 2015; Díez-Martín et al., 2016). Normative institutions are expected to have an impact on entrepreneurial innovation:

- H4. The societal perception of entrepreneurship as a good career choice has a positive impact on entrepreneurial innovation.
- H5. The perception of a high societal status for successful entrepreneurship has a positive impact on entrepreneurial innovation.
- H6. Media attention given to successful entrepreneurs has a positive impact on entrepreneurial innovation.

### *2.4. Cognitive and individual aspects*

The cultural-cognitive pillar as denoted by Scott (2008) underlines the shared understanding that forms social reality and defines what is meaningful to members of a society. "The cognitive dimensions of human existence: mediating between the external world of stimuli and the response of individual organism is a collection of internalized symbolic representations of the world" (Scott, 2008, p. 57). Cognitive institutions represent the dominant structure that informs a country's belief regarding accepted behavior learned through social interactions (Urban, 2013). The cognitive aspect asserts individuals' knowledge and skills and the frames used to evaluate information in a certain country (Spencer and Gómez, 2004). Moreover, the cognitive institutional pillar includes the writings, schemes, and elements that guide individuals' behavior in a certain sociocultural context (Bruton et al. 2010). Studies have recognized the relationship between cognitive skills and positive economic and social phenomena, including the individual rates of successful and productive entrepreneurship (Hafer and Jones, 2014).

Entrepreneurial traits are considered as critical in explaining firms' innovation propensity (Olivari, 2016). Ali and Shah (2015) found a positive and significant correlation between attitudes and intention towards entrepreneurship. The GEM APS questionnaire focuses on perceptions of individuals' attitudes, instead of objective attitudes. Bosma and Schutjens (2011) postulate that perceptions are more pertinent when assessing entrepreneurial possibilities; in essence, they are more objective than real attitudes. Perceptual variables, such as recognition of opportunities, fear of failure, and confidence in one's abilities, are

significant for new business formation (Arenius and Minniti, 2005). Individuals who perceive opportunities are found to be important predictors of both start-up intentions and participators in start-up activity (Stuetzer et al., 2014). Individuals' opportunity perceptions can initiate engagement in nascent entrepreneurial activities (Tama´sy, 2006). Opportunity perception and confidence in one's abilities were positively associated with the choice of being a nascent entrepreneur, whereas fear of failure was negatively associated (Arenius and Minniti, 2005). Self-confidence has a positive and significant effect on entrepreneurial innovativeness (Koellinger, 2008).

The two cognitive variables used in this study (i.e., fear of failure and entrepreneurial intention) are operationalized by APS GEM data. Bird (1988) defines entrepreneurial intentions (EI) "as a conscious state of mind that directs personal attention, experience, and behavior toward planned entrepreneurial behavior." EI is considered as significant in recognizing entrepreneurship as a process, and is a predictor of entrepreneurial behavior (Bird, 1988; Autio et al., 2001; Zhang and Duan, 2010). Beynon et al. (2016) considered the effect of attitudes and perceptions on Total Early-Stage Entrepreneurial Activity using different variables, including entrepreneurial intent. This study followed the Bosma and Levi (2010) definition of entrepreneurial intention, and views intention as a cognitive indicator of an individual's ability to start an innovative business. Acceptance of higher levels of risk and uncertainty was measured using the GEM perception of fear of failure (Koellinger, 2008; Beynon et al., 2016; Lecuna et al., 2017). As such, the study posits that cognitive aspects are associated with entrepreneurial innovation:

- H7. Individuals with entrepreneurial intentions are more likely to start innovative businesses
- H8. Individuals with lower perception of fear of failure are more likely to start innovative businesses

### *2.4. Supportive aspects*

Stenholm et al. (2013) introduced this dimension and analyzed the types of institutions needed to support the emergence of high-impact innovative firms. The conductive (i.e. supportive) aspect covers conditions essential for innovation and knowledge-driven growth, such as "feeder" industries and institutions, a skilled workforce, sophisticated markets (including financial markets), and high-quality higher-education institutions (Stenholm et al.,

2013). Okruhlica and Holienka (2018) assert that the conductive dimension does not impact the level of entrepreneurial activity; however, it is closely related to innovative, high-growth, and high-impact entrepreneurship. Van de Ven (1993) emphasizes the importance of industrial infrastructures in facilitating entrepreneurship. These include institutional arrangements to legitimize, regulate, and standardize a new technology, and public resource endowments for basic scientific knowledge, financing mechanisms, competent labor, and proprietary R&D.

According to the Global Innovation Index (Dutta, 2012), innovation is an outcome of several inputs combining institutions, human capital and research, infrastructure (including information communication technology (ICT)), and market and business sophistication (Schott and Sedaghat, 2014). ICT alters the relationship between entrepreneurship and innovation and promotes the formation of new ventures (Colovic and Lamotte, 2015). Audretsch and Belitski (2017) found a strong association between ICT use and entrepreneurship. This study suggests that the use of new technologies (including IT) and faster access to information and the internet may lead to higher levels of technology, general entrepreneurial activity, and innovation. Colovic and Lamotte (2015) noted that there has been an evidence from previous studies of the positive e impact of technology on the advancement on entrepreneurship. Yunis et al. (2017) examined the relationship between ICT use and organizational performance using Lebanon as an example. The results confirmed the positive and significant association among ICT use, innovation, and corporate entrepreneurship. However, the study stressed the importance of the innovative use of ICT on organizational performance. Alderete (2014) examines the level of entrepreneurial activity across countries emphasizing the role of ICT development. The results indicate that countries with higher ICT development index (IDI) attain higher levels of entrepreneurial activity. Chen et al. (2015) utilizing PLS structural equation modelling finds that that IT competencies is positively related to a firm's corporate entrepreneurship and leads to the advancement of product innovation performance. The study stress the significance of IT capabilities for both corporate entrepreneurial activity and product innovation performance. A country endowed with IT infrastructure that facilitates rapid information and internet access can promote higher levels of entrepreneurial activity and innovation (Dahlman, 2007).

The quality of the national educational system has a direct impact on entrepreneurs' level of creativity and competence (Schott and Sedaghat, 2014). Entrepreneurs' innovation ability is influenced by intrinsic individual characteristics, and enhanced by the quality of the national education system (Schott and Sedaghat, 2014). Puente et al. (2017) found a positive and direct association between the education level and growth aspiration of Venezuelan entrepreneurs. Levie and Autio (2007) linked high-growth entrepreneurial activity with national levels of entrepreneurship education and training. Basic scientific and technological research provide the foundation for the knowledge that facilitates technological innovation and commercialization. However, this basic knowledge accumulation is costly relative to diffusion and imitation. Therefore, firms must engage in a variety of strategies to acquire this knowledge at a lower cost, including joint R&D ventures between private firms and basic research centers (Van de Ven and Polley, 1999).

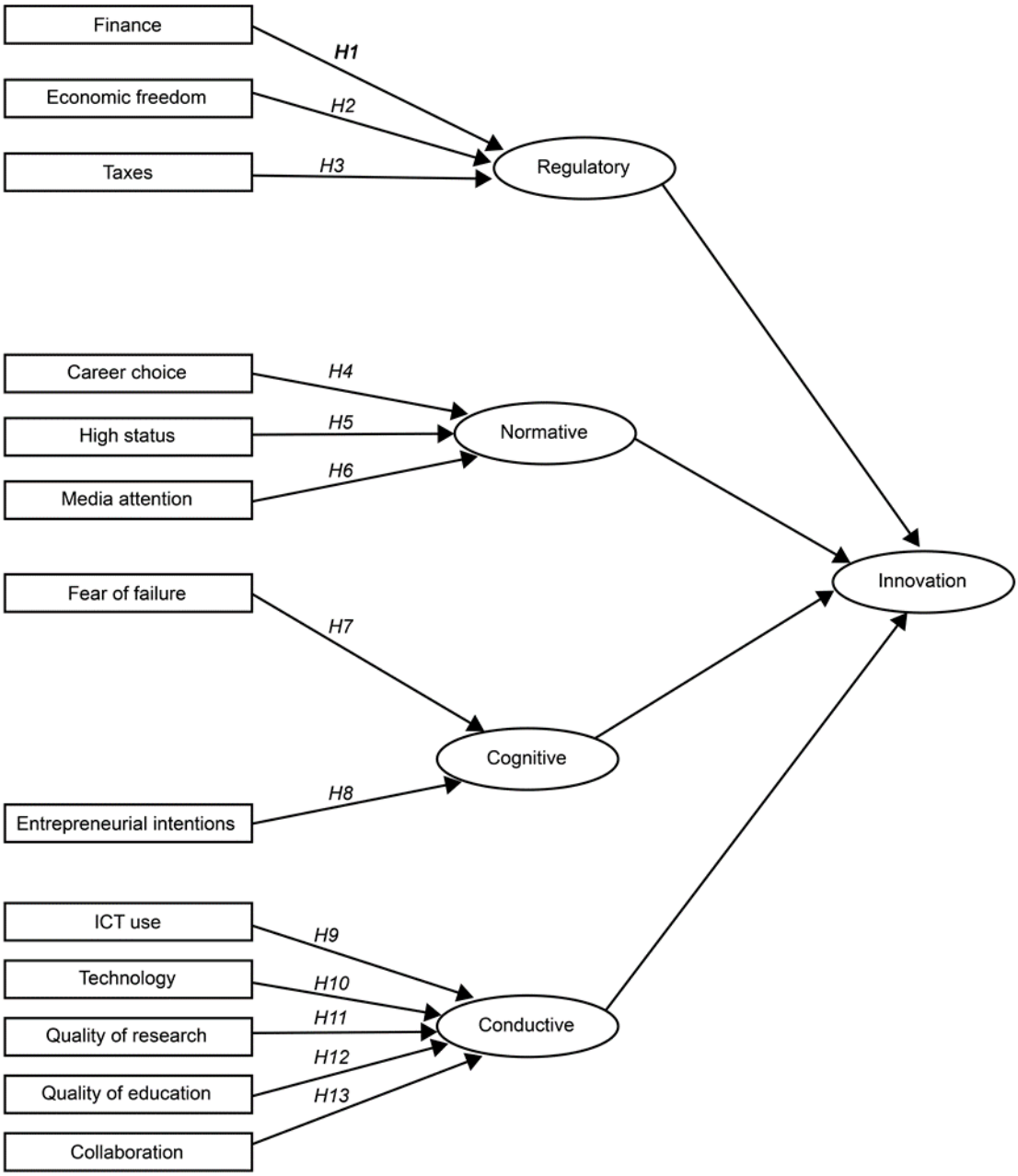
Audretsch et al. (2012) found that regional competitiveness and university spillovers have a positive impact on entrepreneurial innovation. Lynskey (2004) examined the role of several institutional variables on innovative activity and found a significant and positive association between university-industry linkages and the innovation level in technology-based start-ups in Japan. Audretsch and Lehmann (2005) found evidence that the Knowledge Spillover Theory (KST) applies to both regions and industries. These studies are consistent with the Knowledge Spillover Theory of Entrepreneurship. Entrepreneurial activity entails not only the arbitrage of opportunities, but also the exploitation of intra-temporal knowledge spillovers by agents who endogenously exploit knowledge that is not appropriated by incumbent firms. Thus, environments with low investment levels in new knowledge creation exhibit fewer entrepreneurial opportunities based on potential knowledge spillovers (Acs et al., 2009, 2013). Mueller (2006) found that higher levels of entrepreneurship and university-industry linkages increase the permeability of the knowledge filter (Acs et al., 2005) and function as channels for knowledge flow and increasing regional economic growth. Therefore, this study posits that conductive aspects have a positive impact on entrepreneurial innovation:

- H9. ICT has a positive impact on entrepreneurial innovation.
- H10. Technological adoption has a positive impact on entrepreneurial innovation.
- H11. High-quality scientific research institutions have a positive impact on entrepreneurial innovation.

- H12. Highly developed educational systems have a positive impact on entrepreneurial innovation.
- H13. University-industry collaboration in R&D has a positive impact on entrepreneurial innovation.

This study investigated a cross-national country institutional profile construct to validate an entrepreneurial innovation model (Busenitz et al., 2000). It utilized structural equation modeling (SEM) to assess the impact of country-level conditions and national institutions on entrepreneurial activity (Stenholm et al., 2013; Vidal-Suñé and López-Panisello, 2013). The measurement model was developed by integrating institutional (i.e., regulatory, normative, cognitive, supportive) factors to test their impact on entrepreneurial innovation across 65 GEM countries. Figure 1 illustrates the conceptual model by outlining the relationships between entrepreneurial innovation and the aforementioned institutional factors. The study conducted path analysis corresponding to Hypotheses H1 to H13.

**Figure 1: Conceptual Framework and Hypotheses**


Finance
Economic freedom
Taxes
H1
H2
H3
Regulatory
Career choice
High status
Media attention
H4
H5
H6
Normative
Fear of failure
Entrepreneurial intentions
H7
H8
Cognitive
ICT use
Technology
Quality of research
Quality of education
Collaboration
H9
H10
H11
H12
H13
Conductive
Innovation

## 3. Data Collection and Sample

This study examined the cross-invariance between different institutional factors and entrepreneurial innovation. While SEM is considered a confirmatory technique, it also extends the possibility of relationships among the latent variables, and encompasses two components: a measurement model, which is essentially CFA, and a structural model (Schreiber et al., 2006). The applicability of institutional factors to this study was investigated by applying CFA to test the measurement model.

Data were mainly obtained from GEM, specifically from the GEM APS and NES for 2016. Further data were obtained from the Global Competitiveness Index (GCI), Index of Economic Freedom (IEF), and World Development Indicators (WDI). All indicators were normalized to 0 (lowest value) and 1 (highest value) using Amos v.20. The 2016 GEM dataset includes 65 countries; the APS includes responses from more than 182,000 individuals across the globe (GEM, 2017). The NES-GEM was completed by 66 countries and includes experts' opinions on EFCs within each country. This study used the dataset for all 65 countries.

Ahmad and Seymour (2008) define innovative entrepreneurial activity as enterprising human action that generates value by expanding or creating economic activity, which assists in discovering new products or markets. Innovation is a subjective notion. For example, the perception of the entrepreneurship innovativeness of products and services in emerging countries was found to be higher than in developed economies (Lamotte and Colovic, 2013). This study used product innovation to represent innovation; GEM defines product innovativeness as the percentage of TEA businesses that indicate that their product or service is new to at least some customers (Reynolds et al., 2003).

Several country-level explanatory variables were used to measure four aspects of national institutions: regulatory, normative, cognitive, and conducive. In addition, the study controls for gross domestic product (GDP). The 2016 economic freedom index (IEF) (Miller and Kim, 2016) was used to measure the regulatory aspect. Few studies have relied on the GEM- EFC survey to measure certain institutional aspects (Pinho, 2017). Financing data for entrepreneurs were obtained from the GEM 2016 EFC survey. The effect of taxes and bureaucracy was represented by the GEM EFCs that measure government policies on taxes,

used specifically to encourage new and growing firms (Bosma and Levie, 2010). The normative aspect was represented by employing a range of variables derived from the GEM 2016 APS survey, and measures societal values regarding entrepreneurship, including the level of status and respect given to entrepreneurs by society, media attention given to successful entrepreneurs, and whether starting a new business is considered a desirable career choice. The cognitive aspect was derived from GEM 2016 APS data and captures individual attributes of entrepreneurs. This dimension was represented by two variables: fear of failure and entrepreneurial intentions.

The conductive aspect was obtained from the 2015–2016 Global Competitiveness Report. The quality of scientific research institutions was represented by the pillar twelve element that measures the presence of high-quality scientific research institutions. Pillar twelve includes university-industry collaboration in R&D, representing business and universities' collaboration on research and development. Quality of education was represented by the pillar five element that measures this aspect, as evaluated by business leaders. Pillar nine represents technological adoption and ICT use—two main elements that address technological readiness within this pillar. Moreover, the pillar measures how an economy adapts to existing technologies to enhance industry efficiency (WEF, 2016). The choice of variables for each element in this study was based on previous literature as shown in table 1.

Table 1: Choice of variables used in the model

| ***Institutional Aspect*** | ***Index*** | ***Study*** |
|---|---|---|
| *Regulatory Indicators* | | |
| The orientation of the country's financial system toward entrepreneurship. | GEM 2016, National Experts Survey (NES). | De Clercq et al. (2012). |
| Economic freedom. | The 2016 economic freedom index (IEF) | Fuentelsaz et al. (2018). |
| Government policies and taxes. | GEM 2016, National Experts Survey (NES). | Bowen and De Clercq (2008). |
| *Normative indicators* | | |
| Societal perception of entrepreneurship as a good | GEM 2016, Adult Population Survey (APS). | Díez-Martín et al. (2016). |

| | | |
|---|---|---|
| career choice. | | |
| The perception of a high societal status for successful entrepreneurship. | GEM 2016, Adult Population Survey (APS). | Díez-Martín et al. (2016). |
| Media attention given to successful entrepreneurs. | GEM 2016, Adult Population Survey (APS). | Díez-Martín et al. (2016). |
| ***Cognitive and individual aspects*** | | |
| Entrepreneurial intentions. | GEM 2016, Adult Population Survey (APS). | Liñán et al. (2011). |
| Fear of failure | GEM 2016, Adult Population Survey (APS). | Urbano and Alvarez (2014). |
| ***Supportive aspects*** | | |
| ICT use. | GCI, 2016 | Natário (2018)*. |
| Technological adoption. | GCI, 2016 | Natário (2018). |
| Quality of scientific research institutions. | GCI, 2016 | Natário (2018). |
| University-industry collaboration in R&D. | GCI, 2016 | Stenholm et al. (2013). |
| Quality of education. | GCI, 2016 | Natário (2018). |

*Natário (2018) utilize pillar nine that address technological readiness, technological adoption and ICT us are two main elements within this pillar.

## 4. Data Analysis and Findings

The constructed model comprises 13 items that define four latent constructs: regulatory, normative, cognitive, and conductive variables. Table 2 presents the overall goodness-of-fit statistics for the measurement model. The chi-square to DF ratio (CMIN/DF) of 1.64 is less than 3, indicating acceptable fit (Kline, 2005). The goodness-of-fit (GFI) value is very close to the cut-off value of 0.9; more than 0.9 generally indicates acceptable fit (Tabachnick and Fidell, 2007). The root mean square error of approximation (RMSEA) of 0.071 is within the acceptable range of 0.05–0.08 (Hair et al., 2005). The measurement of the normed fit index (NFI) of 0.921 is higher than the cut-off value of 0.9 (Kline, 2005). The parsimony normed fit index (PNFI) of 0.67 is within the usual range of 0–1; higher values signify a more

parsimonious fit (Schermelleh-Engel et al., 2003). The comparative fit index (CFI) and the Tucker-Lewis Index (TLI) (Tucker and Lewis, 1973) or non-normed NFI (NNFI) is 0.919 and 0.901, respectively, both higher than and close to the cut-off value of 0.9 (Kline, 2005). Given the acceptable fit between the hypothetical model and sample data, the study sought to assess the psychometric properties of the instrument in terms of reliability, convergent validity, and discriminant validity.

[INSERT TABLE 1 ABOUT HERE]

Chronbach's alpha assesses the internal consistency reliability of the construct; the acceptable reliability statistic of 0.902 exceeds the 0.7 threshold (Nunnally, 1978). Table 3 shows the results of internal consistency and Cronbach's coefficient alpha estimates.

[INSERT TABLE 2 ABOUT HERE]

The data's appropriateness for factor analysis was assessed with the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy (Kaiser, 1970; Kaiser, 1974) and Bartlett's Test of Sphericity (Bartlett, 1950). The KMO test was employed to estimate the factorial analysis. Its index ranges from 0 to 1; the value of 0.50 is considered appropriate for the use of factor analysis (Hair et al., 2005). The value of the KMO test of 0.82 indicates that factor analysis is applicable (Table 3). Bartlett's Test of Sphericity must be significant ($p<.05$) for factor analysis to be appropriate (Hair et al., 2005).

[INSERT TABLE 3 ABOUT HERE]

Standardized factor loading for latent constructs indicates whether the observed and latent variables (i.e., items) are correlated, or whether the observed variables are appropriate measures of the latent constructs, signifying convergence validity (Phuangrod et al., 2017). The observed variables' measurements indicate divergent validity between latent and observed variables. The results (Table 4) indicate a factor loading larger than 0.50 for the regulative, cognitive, and conductive factors, representing a significant correlation with the latent variable (Hair et al., 2017). However, the normative factor has a low factor loading indicating a low correlation with the latent variable. The factor loading range of 0.325–0.462 for the normative factor observed variables indicates a low correlation with the latent

variable; the range for all three observed cognitive variables of 0.438–0.555 suggests a high correlation with the cognitive latent variable, excluding fear of failure, with a low factor loading of 0.438. The range for regulatory observed variables of 0.555–0.811 indicates a high correlation between observed and latent variables. Moreover, the factor loading range for the conductive observed variables of 0.654–0.967 indicates a high convergent validity.

[INSERT TABLE 4 ABOUT HERE]

The formerly posed hypotheses were tested using the SEM approach. Table 5 shows a standardized coefficient between the normative dimension and entrepreneurial innovation of -0.114, with low statistical significance ($p< 0.01$). Therefore, Hypothesis 4 indicates a negative relationship between the normative dimension and entrepreneurial innovation rate.

The standardized coefficient between regulatory factors (i.e., taxes, financing, and economic freedom) and entrepreneurial innovation of 0.575, with $p<0.001$, indicates a significant and positive impact of the regulatory environment on entrepreneurs' choice to pursue an innovative activity.

The standardized coefficient between the cognitive aspect and entrepreneurial innovation rates is -0.666 ($p<0.001$). Fear of failure has a negative and significant impact on entrepreneurial innovation rates, at -0.783 ($p<0.001$). The relationship between intention and entrepreneurial innovation is negative (-1.277), with $p<0.001$.

The standardized coefficient between the conductive aspect of entrepreneurial innovation of 1.98 is positive and significant at $p<0.001$. The conductive aspect has positive effects on the innovation rate; the standardized path coefficient of 1.918 is statistically significant ($p<0.001$). The results show that all conductive factors are positive and statistically significant at $p<0.001$.

[INSERT TABLE 5 ABOUT HERE]

## 5. Discussion and Conclusion

This study finds a significant and positive impact of the regulatory environment on entrepreneurs' inclination to pursue an innovative enterprise. It finds that all conductive factors are positive and statistically significant. However, normative institutional aspects of the society do not affect innovation rates outcomes. An unfavorable cognitive institutional environment, referring to fear of failure, has a negative and significant impact on the entrepreneurial innovation rate and constrains firms in terms of innovative activity.

This study's findings support the results of Stenholm et al. (2013), which demonstrate evidence of a negative association between the normative aspect and growth and innovation-oriented new ventures; the results may suggest that the societal view does not affect the choice to pursue innovative entrepreneurship. These results also concur with Spencer and Gómez (2004) who found that normative institutions were to some degree correlated with the basic form of entrepreneurship, but didn't predict the more advanced forms of entrepreneurial activity. Interestingly, when modeling the effects of normative factors on entrepreneurial innovation separately, the relationship becomes positive and significant, with $p<0.01$. Career choice, high status, and media attention exhibit a positive relationship with the normative dimension.

The findings indicate a significant and positive impact of the regulatory environment on entrepreneurs' choice to pursue an innovative activity; it conforms to Busenitz et al. (2000), who suggest that the regulatory aspect correlates positively with a country's level of entrepreneurship. It is also consistent with Urban (2016), who found that the regulatory dimension positively influences venture innovation performance in South Africa, and Spencer and Gomez's (2004) presumption that regulatory and strong institutions encourage individuals follow highly advanced forms of entrepreneurship. The study asserts the strong association between regulative institutions and sophisticated and advanced form of entrepreneurial activity.

The analysis of the data has further implications. Previous studies support the negative effect of fear of failure on entrepreneurial activity (Arenius and Minniti, 2005; Beynon et al., 2016). Other studies on the relationship between entrepreneurial activity and entrepreneurial intention found a positive relationship (Beynon et al., 2016). The negative relationship between entrepreneurial intention and entrepreneurial innovation might indicate that, while intention positively affects some forms of entrepreneurial activity, it impacts negatively on other forms of entrepreneurship like entrepreneurial innovation.

The significance of collaboration between universities and industries as a supportive factor for high-growth innovative entrepreneurship is confirmed by (Stenholm et. al., 2013). Innovation entrepreneurship is enhanced by quality of national education specifically when combined with entrepreneurial networking (Schott and Sedaghat, 2014). The results is consistent with (Lynskey, 2004) that finds a relationship between the quality of research in a country and the level of entrepreneurial innovation rate. The results of this study with regard to the level of ICT use and technology adoption align with (Audretsch and Belitski, 2017) which shows a robust and high level of association between ICT and entrepreneurship. Stenholm et al. (2013) which denotes that access to new technologies improves the type of entrepreneurial activity in a country and support high-growth and innovative new ventures. Lynskey (2004) which indicates that technological capabilities is crucial in determining the firms' innovation levels. Development of new technologies and aligning IT with business is crucial in the development of both general and innovative entrepreneurship (Audretsch and Belitski, 2017). Where access to ICT is a necessary condition in the development technology entrepreneurship (Colovic and Lamotte, 2015).

## 6. Research implications and limitations

Innovation is considered a significant factor in fostering economic growth and prosperity (Solow, 1957). However, the research is silent on which institutional factors drive entrepreneurial innovation. This study shed light on the relationship between the institutional environment and country-level innovative entrepreneurial activity. The findings highlight certain institutions as leading determinants of entrepreneurial innovation.

The findings of this paper must be viewed in light of its limitations. For example, our exploratory design does not approve of causal conclusions. For future research, longitudinal designs would be useful for measuring the direction of causality and including the dimension of change over time (Stenholm, 2013). Further, researchers, particularly those interested in innovative entrepreneurship, are encouraged to further study the institutional aspects by focusing on the moderating effect of other institutional and conductive predictors (De Clercq et al., 2013). Conceptually, this study developed a research model to capture the relationship between institutional aspects and innovative entrepreneurship. Future research should examine the potential nonlinear effects that this study did not model, as SEM assumes the presence of linear relationships.

The analysis has implications for scholars, practitioners, and public policy makers. Given the need to better understand the institutional structures within and across countries, it enhances knowledge about the influence of specific institutional aspects on innovative entrepreneurship. Governments devote substantial efforts and resources to the design and implementation of policies to promote innovation. Moreover, policymakers should pay attention to the institutional aspects in order create an environment that is conducive to innovative entrepreneurship. Policies intended for encouraging innovative entrepreneurship should pay attention to the cognitive aspects of entrepreneurial innovative, for example, fear of failure. Such interventions should target both individual attributes and context (Obschonka et al., 2010). Higher levels of technology adoption, ICT use, collaboration between universities and industries, quality of education, and quality of research are associated with a higher entrepreneurial innovation rate. The lack of attention to certain institutional aspects, specifically the regulatory aspects, can create an unfavorable environment for innovative entrepreneurship. In addition, it seems that conductive factors are the most critical in creating an inductive and supportive environment for entrepreneurial innovation. Policies that improve environmental conditions and foster institutional reform are required to foster entrepreneurial innovation.

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